REPORT DOCUMENTATION PAGE

Form Approved OMB NO. 0704-0188

1. REPORT DATE (DD-MM-YYYY)	2. REPORT TYPE	3. DATES COVERED (From - To)
31-08-2017	Final Report	15-Apr-2016 - 14-Apr-2017

4. TITLE AND SUBTITLE
Final Report: Travel Support for Scientists to Participate in ACS Symposium

5a. CONTRACT NUMBER
W911NF-16-1-0110

5b. GRANT NUMBER

5c. PROGRAM ELEMENT NUMBER
611102

6. AUTHORS

5d. PROJECT NUMBER

5e. TASK NUMBER

5f. WORK UNIT NUMBER

7. PERFORMING ORGANIZATION NAMES AND ADDRESSES
University of Notre Dame
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8. PERFORMING ORGANIZATION REPORT NUMBER

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS (ES)
U.S. Army Research Office
P.O. Box 12211
Research Triangle Park, NC 27709-2211

10. SPONSOR/MONITOR'S ACRONYM(S)
ARO

11. SPONSOR/MONITOR'S REPORT NUMBER(S)
69185-CH-CF.1

12. DISTRIBUTION AVAILIBILITY STATEMENT
Approved for public release; distribution is unlimited.

13. SUPPLEMENTARY NOTES
The views, opinions and/or findings contained in this report are those of the author(s) and should not contrued as an official Department of the Army position, policy or decision, unless so designated by other documentation.

14. ABSTRACT

15. SUBJECT TERMS

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	15. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			Haifeng Gao
UU	UU	UU	UU		19b. TELEPHONE NUMBER 574-631-8023

RPPR Final Report
as of 05-Oct-2017

Agency Code:

Proposal Number: 69185CHCF **Agreement Number: W911NF-16-1-0110**
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DUNS Number: 824910376 EIN: 350868188
Report Date: 14-Jul-2017 Date Received: 31-Aug-2017
Final Report for Period Beginning 15-Apr-2016 and Ending 14-Apr-2017
Title: Travel Support for Scientists to Participate in ACS Symposium
Begin Performance Period: 15-Apr-2016 **End Performance Period:** 14-Apr-2017
Report Term: 0-Other
Submitted By: Haifeng Gao Email: gao.13@nd.edu
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Distribution Statement: 1-Approved for public release; distribution is unlimited.

STEM Degrees: 0 **STEM Participants:** 2

Major Goals: The rapid development of polymerization techniques and polymer reaction chemistries has generated significant progress on the synthesis of functional polymers with sophisticated nanostructures, and subsequently led to the exploration of their novel properties that can be utilized for new applications in biomaterials, nanomedicines, catalysis, environmental remediation and sustainable energy technologies. Although conventional polymer structures, such as star polymers and graft copolymers, have been commonly synthesized, future development in this area urgently requires not only judicious synthetic strategies to next-generation nanomaterials, but also intensive collaboration and knowledge exchange among synthetic chemists, polymer physicists and materials scientists.
The symposium covered the latest advances on the synthesis and application of functional polymers with sophisticated nanostructures, including star polymers, graft polymers, molecular brushes, dendrimers, (hyper) branched polymers and various branched polymer structures constructed from supramolecular assemblies, for the interests of both academic and industrial scientists. The topics included new structure design, polymerization methods, chemical modification and functionalization, structure-property relationship, as well as new concepts in characterization and applications.

Accomplishments: With the generous sponsorship of Army Research Office, I in the past year successfully organized the symposium “Advances in Functional Polymers with Sophisticated Branched Structures” together with two other faculty Dr. Chong Cheng (University of Buffalo) and Dr. Renaud Nicolay (ESPCI-Paris, France) at the 252nd ACS National Meeting in Philadelphia, Aug 21-25, 2016. In this two-day event, we have 30 oral presentations (17 invited talks) and 10 posters. Well-known polymer chemists from the world participated in the symposium, including Prof. Ken Wagener (University of Florida), Prof. Nikos Hadjichristidis (King Abdullah University of Science and Technology), Prof. Kris Matyjaszewski (Carnegie Mellon University), Prof. Scott Grayson (Tulane University), Prof. Jemeriah Johnson (MIT), Prof. Julien Nicolas (Université Paris-Sud).

Training Opportunities: Among the 30 oral presentations, 10 were given by graduate students and postdoctoral researchers. All of the nice poster presentations were given by graduate students and postdoctoral researchers. This forum provides a platform for the talented graduate students in US and around the world for networking to interact with academic leaders and industry scientists.

Results Dissemination: Thirty oral presentations and 9 posters at the 252nd ACS National Meeting.

Honors and Awards: Nothing to Report

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Protocol Activity Status:

Technology Transfer: Nothing to Report

Summary:
The ARO funding (W911NF1610110) was provided to support a symposium titled "Advance in Functional Polymers with Sophisticated Branched Structures", held in Philadelphia, PA on August 21-25, 2016. The symposium included four regular sessions with a total of 30 oral lectures and an additional poster session that featured 9 posters. The symposium allowed exchange and dissemination of information among researchers from various countries, including many US academic laboratories. The symposium covered the latest advances on the synthesis and application of functional polymers with sophisticated nanostructures, including star polymers, graft polymers, molecular brushes, dendrimers, (hyper)branched polymers and various branched polymer structures constructed from supramolecular assemblies.

Significance:
The rapid development of polymerization techniques and polymer reaction chemistries has generated significant progress on the synthesis of functional polymers with sophisticated nanostructures, and subsequently led to the exploration of their novel properties that can be utilized for new applications in biomaterials, nanomedicines, catalysis, environmental remediation and sustainable energy technologies. Although conventional polymer structures, such as star polymers and graft copolymers, have been commonly synthesized, future development in this area urgently requires not only judicious synthetic strategies to next-generation nanomaterials, but also intensive collaboration and knowledge exchange among synthetic chemists, polymer physicists and materials scientists.
The symposium covered the latest advances on the synthesis and application of functional polymers with sophisticated nanostructures, including star polymers, graft polymers, molecular brushes, dendrimers, (hyper)branched polymers and various branched polymer structures constructed from supramolecular assemblies, for the interests of both academic and industrial scientists. The topics included new structure design, polymerization methods, chemical modification and functionalization, structure-property relationship, as well as new concepts in characterization and applications.

Outcome and impact:
With the unprecedented development of new polymerization techniques, the synthesis and structural control of polymers with sophisticated structures has witnessed significant progress in the last decades. These polymeric soft nanomaterials have demonstrated interesting properties with great potentials in applications ranging from nanomedicines, polymer catalysts, to self-healing materials and pollution salvation materials. On this aspect, both academia and industrial laboratories have reached a consensus on the importance of these types of nanomaterials. This symposium provides a fabulous platform for the exchange of expertise and ideas within this field and facilitate the discovery of new research directions. The knowledge gained from this symposium certainly benefits all participants, especially the graduate students and postdoctoral researchers. Among the 30 oral presentations, 10 were given by graduate students and postdoctoral researchers. All of the nice poster presentations were given by graduate students and postdoctoral researchers. This forum provides a platform for the talented graduate students in US and around the world for networking to interact with academic leaders and industry scientists.

The budget ($5050) of the ARO support was dedicated to help offset partial expense of the invited speaker dinner, the registration cost of 8 presenters, including two graduate students, and three assistant professors.